MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2018 / 2019

PCO0165 – INTRODUCTION TO COMPUTER ARCHITECTURE AND OPERATING SYSTEM

(Foundation in Information Technology)

17 October 2018
9.00 a.m – 11.00 a.m
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of 3 pages (excluding the cover page) with 5 questions only.

2. Answer **ALL** questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please write all your answers in the Answer Booklet provided.

Instructions: Answer **ALL** questions. Write your answers in the Answer Booklet.

QUESTION 1 [10 Marks]

a. Explain briefly the difference between system interconnection and CPU interconnection. (2 marks)

b. Explain why vacuum tubes were replaced by transistors in second generation of computers. (2 marks)

c. Processor organization describes the interconnection of the major components of a CPU to the rest of the computer system via the system bus. List and briefly describe **FOUR (4)** of the tasks that the CPU must perform. (4 marks)

d. A machine cycle is defined to be the time taken by CPU to do basic operations. It consists of a sequence of three steps that is performed continuously and at a rate of millions per second while a computer is in operation. Explain the difference between the instruction time and the execution time. (2 marks)

QUESTION 2 [10 Marks]

a. Convert the following decimal notations to their binary equivalents. Show computation steps.
   i. 223_{10}
   ii. 174.25_{10} (3 marks)

b. Convert the following binary numbers to decimal equivalents. Show computation steps.
   i. 101111010.001_2
   ii. 110010101.101_2 (3 marks)

c. Convert the following hexadecimal notations to their binary equivalents. Show computation steps.
   i. $3F7A.9D_{16}$
   ii. $5CB8.46_{16}$ (2 marks)

d. Convert the following octal notations to decimal equivalents. Show computation steps.
   i. 276_8
   ii. 0.65_8 (2 marks)

Continued...

QUESTION 3 [10 Marks]

a. Calculate the addition arithmetic operation of the following unsigned binary numbers. Show computation steps.
   i. 11100100 + 01101011
   ii. 11001110 + 11101101

(3 marks)

b. Calculate the subtraction arithmetic operation of the following unsigned binary numbers. Show computation steps.
   i. 11101011 - 00110110
   ii. 11110111 - 10111100

(3 marks)

c. Solve the following addition operations using the two's complement addition in 5-bit for signed integer. Show computation steps.
   i. (-7) + (9)
   ii. 9 + (-5)

(4 marks)

QUESTION 4 [10 Marks]

a. There are five addressing modes used in the 8085 microprocessor. Describe the following addressing modes. Give an example for each of the addressing mode.

   i. Register addressing
   ii. Indirect addressing

(2 marks)

b. Explain the meaning of the following assembly language instructions code.
   i. LDA 3000H
   ii. MVI M, 20H
   iii. LXI H, 8000H
   iv. XCHG

(4 marks)

c. Given value in register, A is 9DH and value in register B is 3FH. Subtract the contents of register B from register A and place the result in memory location 6000H.

(4 marks)

QUESTION 5 [10 Marks]

a. Explain the difference between multi-user and multithreading operating systems.

(2 marks)

b. User interface (UI) is one of the most critical factors of designing an operating system because a user interface (UI) brings structure to the interaction between a user and the computer. List and explain briefly the **TWO (2)** common types of user interface (UI) found in the operating system.

(2 marks)

c. A utility program, also called a utility, is a type of system software that allows a user to perform maintenance-type tasks, usually related to managing a computer, its devices, or its programs. Briefly discuss the functions of the following utility programs.

i. Disk scanner utility
ii. Diagnostic utility (2 marks)

d. The most important parts where file systems are likely to be different are based on the structure of the directories and the connection between them. Briefly discuss the following directory structures.

i. Single level directory
ii. Two level directory (4 marks)

End of Paper